respective detectors; where the optical axes of all X-ray lenses and central channels of collimators cross in the current point, to which the measurement results are attributed.

38. (New) Device according to claim 27, wherein said one or more X-ray sources (1) incorporated in the X-ray optical system are quasi-point; each of the X-rays concentration means for radiation concentration is made as an X-ray lens (2) focusing divergent radiation from a respective source (1); each of the means for transportation of excited secondary radiation to detector (20) is made as a collimator (19), its channels fanning towards a respective detector; where the optical axes of all X-ray lenses and central channels of collimators cross in the current point, to which the measurement results are attributed.

REMARKS

The Office action of September 6, 2002, has been carefully considered, and the application has been amended accordingly.

Applicant respectfully requests entry of the attached English translation of the specification and abstract of the international application (of which the present application is the national stage) as a substitute for the previously filed translation currently being used for examination purposes in this application. The attached substitute translation is presented to provide a more accurate English translation of the international application which was originally filed in the Russian language. The attached substitute translation generally follows the original translation but includes a large number of editorial changes. It does not contain any new matter.

Newly presented Claims 20-38 also generally correspond to

the previously presented original Claims 1-19. In particular, new Claims 28- 29, and 30 are submitted in lieu of original Claims 9, 10, and 11, which the examiner has indicated as being allowable. New Claim 28 is written out in independent form and corresponds to original Claims 8 and 9. Thus, it is believed that Claims 28-30 are allowable.

Applicant has carefully studied the detailed Action, familiarized himself with the cited art, and advises as follows.

1. The terms noted by the Examiner as not clear, concise and exact are due to the original translation into the English language of international application PCT/RU 00/00207, filed in the Russian language. In this connection, Applicant submits herewith an improved translation of specification and abstract which remedies the defects noted by the Examiner. In addition the Applicant explains the terms, noted by the Examiner as unclear as follows:

1) "The point".

Measurement results obtained in the course of implementation of the suggested method and operation of the suggested device form on the basis of output signals of detectors (6, 20). These signals, in turn, are conditioned by intensity of the secondary radiation excited in zone (16), where radiation from X-ray source (sources) (1). Therefore, the measurement results are conditionally attributed (considered belonging) to some point, located within the said zone. For designation of this point, the term "the current point, to which the measurement results are attributed" in used. In the corrected translation it replaces the term "the point, the current results of measurements are referred to".

2) "Arising secondary radiation".

In the corrected translation this term is replaced with "excited secondary radiation".

Here the radiation excited in the substance of the X-rays concentration zone (16) as a result of action on this substance of X-rays from the source (sources) (1) is meant. In contrast to the radiation of the source (sources) (1), which is primary, the excited radiation is named secondary. Excited in zone (16) secondary radiation is transported to detectors (6, 20).

It is possible that the term was unclear also because in claim 8 it was used in phrase "one or more means (3) for arising secondary radiation". In the corrected translation this phrase reads: "one or more means (3) for transportation of excited secondary radiation". Also, before the term "excited", replacing the term "arising", the wording: "transportation of" was added, that had been omitted previously.

2. The Examiner refers to USA patents for substantiation of unpatentability of the applied inventions:

under 35 U.S.C. §102 - patent No.6,052,431 (Onoguchi;

under 35 U.S.C. §103 - patent No. 5,696,806 (Grodzins) together with patent Nos. 6,052,431 (Onoguchi) and 5,812,631 (Yan).

In this connection, Applicant notes the following.

2.1. The method and device disclosed in the patent of Onoguchi, cannot discredit the novelty of the claimed method and device.

The claimed method and device are means for obtaining information about distribution of the substance density of an object as a three-dimensional image or two-dimensional image, in total giving a representation of density distribution throughout the object's volume in total or its part that is studied (target part). In this instance, the said information is obtained by way of detection of the secondary (Compton etc.) radiation excited in the substance of the object under study.

The method and device according to the patent of Onoguchi do not permit to obtain such information. Lines 9-14 (column 3) as indicated by the Examiner do not even contain the word "density"; nor are they encountered in the whole text of the patent specification. The true possibilities of the method and device according to the Onoguchi patent are described in lines 9-14 (column 3) mentioned by the Examiner as follows: "As a result of these measurement signals, the X-ray axis scanning signals can be reconstructed to make a mapping image of surface elements detected by the fluorescent X-rays and a mapping image of the internal structure of the sample as determined from transmitted X-rays". Lines 62-65 (column 4) read: "*... it is possible to obtain a mapping image of surface elements by fluorescent X-ray and also a mapping image of the internal construction of the sample by penetrating X-rays*". This means that the information about the *internal structure of the sample* in the method and device according to the Onoguchi patent is obtained not with the help of fluorescent (i.e. secondary) radiation, but rather with the help of primary radiation from the source, transmitted (penetrating) through the object. Consequently, mapping image of the internal structure of the sample is a usual two-dimensional shadow projection, in which the information about density

distribution through the volume of the sample is lost. As for use of the fluorescent radiation according to the Onoguchi patent, the Examiner quite truly notes: "composition determined by fluorescence". But determining a composition in some point on the sample surface has nothing to do with determining substance density in general and the more so is not a determination of density inside the object.

Thus, the method and devices according to the discussed application ad patent of Onoguchi are incomparable in their principle of operation and possibilities.

The device and patent according to the Onoguchi patent are not identical in the composition of the means used therein. In particular, the Examiner's opinion that x-ray optics is attached to Fluorescent x-ray detector (48) is not based on the text of the patent specification, where nothing is said about presence of special optic elements for transportation of secondary radiation to the detector. In the claimed method and devices such means are used (X-ray lens (2), collimators (15, 19), X-ray half-lens (22)). Besides, the means for data processing and image reconstruction in the device and method according to the Onoguchi patent fulfill other functions that those fulfilled by means (12) in the claimed device and method. They cannot provide for imaging of the internal structure of the object as a picture of three-dimensional distribution of the substance density, because they do not have the input required for this.

In conclusion, it should be noted that the method and device according to the Onoguchi patent are designed for the analysis of a specially prepared sample fit for observation through an optical microscope, while the claimed method and device are

designed for acquiring the image of the internal structure of an arbitrary object in its natural condition, including human body and its particular organs.

The above stated quite clearly illustrates that the claimed method and device cannot be judged disclosed in the Onoguchi patent and, thus, one cannot agree with the conclusion of their unpatentability under 35 U.S.C. §102.

2.2. The information, contained in the patent of Grodzins, when taken together with information contained in patents of Onoguchi and Yan, are insufficient to reject the non-obvious nature of the claimed method and device.

The patent of *Grodzins* describes the method and device, which coincide with their intended use with the claimed and which also use secondary radiation excited in the object's substance to determine density of the elements of the object's internal structure. But, the claimed method and device differ from those known from the Grodzins patent by the totality of the performed operations and design.

In particular, in the claimed method, concentration of the primary radiation from the X-ray source (sources) (1) is performed in a small zone (16), surrounding an inner point of the object, while in the claimed device there are means for such concentration. It is the point, in which it is required to determine density of the substance (it was explained above that it is referred to as "the current point, to which the measurement results are attributed"). If there is only one source of primary X-rays, then this means for X-rays concentration is the focusing X-ray lens (2). If there are several sources of primary X-rays,

then the X-rays concentration means may be either several focusing X-ray lenses (2), which outlet focuses coincide, or several X-ray half-lenses (21), forming crossing beams, or several collimators (13, 18), forming similar beams. Respectively, the concentration zone (16) is either the focal zone of the X-ray lens (lenses), or the zone where the said beams are crossing. The mutual peculiarity of the performed concentration in all options of embodiment of the method and device is that is a small in size internal zone (16) of the object, X-rays intensity is ensured that is considerably increased compared to other exposed elements of the internal structure. The object (or the target part of the object) is scanned by way of moving the said X-rays concentration zone. In the method and device according to the Grodzins patent, action on the object is done by a narrow "pencil" beam of radiation penetrating through the object, while scanning is performed by way of parallel movement of this beam. In this instance, in contrast to the claimed method and device, all elements of the object's internal structure that are on the path of the said beam are in the same conditions (if one disregards considerable attenuation for elements that are more distant from the source), including the elements that are not to be investigated. Those of them that are closer to the source of radiation are exposed to even more extensive irradiation than the internal elements under study. In other words, in the method and device according to the Grodzins patent, there is no radiation concentration similar to the one that takes place in the claimed method and device.

Object scanning means, image processing means are also different.

At the same time, in respect of all mentioned differences, it is impossible to say that they are anticipated or prompted by the information contained in patents of Onoguchi and Yan.

The patent of Yan contains information about X-ray lenses and their capability of focusing radiation to a point or quasi-parallel beam. But it does not give any hint to a person skilled in the art, facing the problem of creating means for obtaining information about substance density distribution inside the object to acquire a three-dimensional image, or a totality of two-dimensional images replacing it. Indeed, it does not follow from it in any way that it is necessary or useful to concentration radiation, in particular, by way of its focusing, to resolve the said problem, while it is clear from the patent of Grodzins, that it is possible to do without concentration.

The Patent to Onoguchi does not give any such hint as well, because in the method and device disclosed therein, concentration of radiation is performed on the surface, but not inside the sample, and this is done not for the subsequent determination of the substance density inside the object (as it was mentioned above, there is no information about density determination inside the object in the patent to Onoguchi).

In the method and device according to the patent to Onoguchi, there are no means either for transportation of the secondary radiation from the internal point of the object to the detector (48) of fluorescent radiation (and there are no optical means for transportation of radiation to this detector at all). The detector (47), used for obtaining information about the internal structure of the object, receives attenuated to this or that degree primary radiation of the X-ray source rather then

secondary radiation. In this instance, the primary radiation after is has passed through the object enters the detector (47) directly, without any use of optics. Therefore, the patent of Onoguchi does not give any hint to a person skilled in the art about using in the method embodiment and incorporation in the device of means that would provide for selective transportation of secondary radiation from the zone of its concentration inside the object to a respective detector.

The patent to Yan, as is noted by the Examiner, contains some information about means for collecting X-rays. But the claimed inventions do not provide for any new means for collecting radiation. In addition, respective means are used in the claimed inventions not for collecting radiation, i.e. not for the purpose of obtaining radiation of higher intensity. They are used for transportation to the detector (detectors) of the secondary radiation specifically from zone (16), in which the primary radiation is concentrated (and not from all parts of the object exposed to primary radiation).

Thus, use of the said transportation means is closely related to the specificity of the principle underlying the particular method and device. The principle here is different than in the patents referred to by the Examiner. Therefore, use of the means for transportation of secondary radiation present in the claimed method and device could not have been hinted in the Prior Art.

The above explanations testify to the fallacy of the conclusion that the claimed method and device are obvious for a person skilled in the art and are not patentable under the provisions of 35 U.S.C. §103.

3. Other patents cited by the Examiner (Hasegawa, No. 6,404,846; Vu, No. 6,381,303; Smith, No. 6,094,472 and No. 5,181,234; Rothschild, No. 5,930,326; Xiao, No. 5,745,547; Eraser, No. 5,727,044; Gibson, No. 5,570,408; Sayama, No. 5,062,127), only characterize the prior art, but do not constitute the sources, on which basis new arguments against patentability of the claimed inventions could be obtained. The patent to Rothschild is the closest by the intended use to the claimed inventions (after the patent of Grodzins); and hereto the major part of what was said in connection with comparison with the patent of Grodzins is applicable.

In view of the foreging, reconsideration of the application is requested, and allowance of Claims 20-38 is courteously solicited.

The Commissioner is hereby authorized to charge any required fees associated with this communication and during the pendency of the application under 37 CFR 1.16 and 37 CFR 1.17 or to credit any overpayment to Deposit Account No. 082670. This sheet is submitted in duplicate.

Respectfully submitted,

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